M/027/007

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
HOUSE RANGE RESOURCE AREA
15 East 500 North
P.O. Box 778
Fillmore, Utah 84631

TAKE PRIDE IN AMERICA

DOGM MINERALS PROGRAM FILE COPY

IN REPLY REFER TO:
3809
(U-054)

September 21, 1992

D. Wayne Hedberg
Utah Division of Oil, Gas and Mining
355 West North Temple
Salt Lake City, Ut. 84180-1203

Dear Mr. Hedberg:

Enclosed is a copy of the BLM, Utah State Office, memorandum you requested. It addresses the Review of Jumbo Mining Company's Drum Mine Expansion by the Cyanide Advisory Board. This was received by our office on August 26, 1992.

Should you have questions regarding this memorandum please call Christina Reid at (801)743-6811.

Sincerely,

Rex Rowley
Area Manager

ACTING

Enclosure:
BLM, Utah State Office, Memorandum (3809 (UT-921))

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SEP 24 1992
DIVISION OF
OIL GAS & MINING

United States Department of the Interior

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BUREAU OF LAND MANAGEMENT
Utah State Office
324 South State, Suite 301
Salt Lake City, Utah 84111-2303

BLM RICHFIELD

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RESOURCES			
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3809
(UT-921)

August 21, 1992
AUG 24 1992

PLANNING			
PROCUREMENT			
SUPPORT SER.			
PERSONNEL			
PAO			
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Memorandum

To: District Manager, Richfield

From: Cyanide Advisory Board Member

Subject: Review of Jumbo Co. Drum Mine Expansion

As requested, the Cyanide Advisory Board has reviewed the Drum Mine plan expansion. The board was timely in their responses but I was not timely in compiling them. I apologize for the delay in getting this information to your staff.

Based on the documents provided for this review, the Plan of Operations is not complete. The Board was particularly concerned about the pad design and the lack of any enviromental monitoring. The Board's specific comments are attached.

If you have any questions regarding the attached comments, please call Terry McParland at (801) 539-4026. Thank you for your patience.

Teresa E. McParland

4 Attachments
1. Cyanide Board Comments on Drum POO
2. Idaho Gold Examples
3. Standard Test Methods for Cyanide in Water
4. Sample Preservation

cc: Jennifer Fox (WO-680), MIB, Room 3538
Scott Haight, Lewistown DO, Montana
Larry Steward, (NV-921)
Jim Robbins, Coeur d'Alene DO, Idaho
Singh Ahuja, Salem DO, Oregon
Jim Hamilton (CA-921)
Harry Delong, (AZ-921)

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	INFO.	ACTION	INITIAL
Warm Springs A.M.			
		✓	CTB
Rudy House Range A.M			
Operations Division			
FILE			

Review of Jumbo Mining Company Proposed Plan of Operations Plan Amendment

1. CBC Engineering Feasibility Analysis dated 6/12/91, only recommends a liner system. The applicant has not adopted these recommendations. The operator must commit to a lining system to adequately review the proposed plan of operation prior to approval.

2. It is unclear as to which liner system is going to be used. The CBC recommended liner system, discussed on page 15, places the leak detection media beneath the secondary liner. The DEQ letter of 12/13/91 discusses a leak detection system between the primary and secondary liner. Some confusion seems to exist as to what liner system is being proposed. Maybe there are other documents, not included in this package or subsequent submissions, that would clear this up.

3. DEQ policy for the primary liner is no thinner than 60-mil thick according to their letter dated 1-25-92. (CBC states 30-mil PVC liner will be used.) If the 60-mil liner is to be used for the primary geomembrane liner instead of the 30-mil thickness, then this change of thickness must be incorporated into the plan of operations. Some contractors prefer to install a thicker liner since they do not have to be as careful when handling the panels and may find it easier to weld the seams (glue).

4. CBC states that PVC liner would be used. The main disadvantage of PVC is its low resistance to ultraviolet radiation. This disadvantage of PVC is overcome by using PVC only in places where it is covered. HDPE is the geomembrane most commonly used to avoid this problem.

5. Concern was expressed that the one-inch slotted PVC pipe used for monitoring leach agent loss would collapse under the loaded ore. Are there any laboratory strength tests available to ensure that this will not happen?

6. DEQ letter dated 12/13/91 states that "Compliance with this performance standard (zero discharge) would be demonstrated by no presence of fluids in the leak detection system." While this is true, it is not valid to assume that just because solution is present in the leak detection system that the facility is out of compliance. If the leak detection system is designed as DEQ suggests (placed between the primary synthetic liner and secondary clay liner), it will almost certainly contain solution. Pinholes, factory defects, or inadequate seams are quite likely to occur in synthetic liners. Synthetic liners placed with angular or granular material, both above and below, are particularly susceptible to damage during installation, or upon loading of the pad. When placed over a more permeable material, such as the leak detection system, flow through these openings is unrestricted. Leakage rates through the upper synthetic liner into the leak detection material are useful only as indicators of the quality of installation for the upper liner, and provide no useful information regarding performance of the lower liner. In short, recovery of solution in the leak detection system is not an indicator of seepage losses to the environment. If a leak detection system is deemed necessary it should be placed beneath the secondary compacted clay liner.

7. More specifics are needed on the quality assurance/quality control programs that will be used during construction (See Jumbo letter dated 9/11/91). Even the best liner system design is useless if poorly installed. The exact types of tests that will be conducted, the frequency of these test, the performance standards, and a commitment to supply BLM with the quality assurance/quality control reports is needed. This also applies to the ponds that must be reconstructed.

8. The spill contingency plan (Jumbo letter dated 9/11/91) should also address solution loss from process ponds, mixing areas, and metal recovery circuits.

9. A leak detection system is required beneath collection ditches and solution ponds constructed to hold process solutions on a regular basis as well as the leach pad.

10. Jumbo's letter dated 9/11/91, page 2 does not address detoxification criteria for heap effluent, i.e., effluent protection limits for cyanide and other possible contaminants nor the length of time these levels need to be maintained. A second draft of the Utah Cyanide Management Plan will be released shortly. The standards that will be proposed in this draft are as follows: spent ore heaps will be neutralized to a sustained level of <.2 mg/l WAD cyanide. Metal levels and other constituents must meet Federal maximum contaminant levels or applicable State requirements if more stringent. The pH levels must be between 6.5 and 8.5. Prior to closure these levels must be maintained over a specific timeframe, i.e., one year or at least during spring runoff/snowmelt without the above levels being exceeded.

11. The amount of solution required to achieve the detoxification criteria needs to be considered (Jumbo letter dated 9/11/91, page 3). Column testing may be appropriate. The results of decommissioning older heaps would be useful. This is necessary for both mine planning and reclamation bond calculations.

12. Jumbo's letter of 9/11/91, page 3 states hydrochloric acid will be used as a neutralizing agent. Hydrochloric acid should not be used as a neutralizing agent.

13. Disposal of final heap draindown volumes need to be addressed (Jumbo letter 9/11/91, page 3). Possible options include; recirculation and evaporation, transport to another mine site, treatment and direct discharge into a waterway, or treatment and land application.

14. The Meteoric Water Mobility Test as proposed in Jumbo's letter dated 9/11/91, page 3, is not valid for sampling ore material for retained cyanide. There is no approved method for solids sampling for cyanide due to the amount of cyanide degradation that takes place during sample collection and preparation. The test procedures proposed - acidification, agitation and aeration - would in fact leave little if any cyanide present in the leachate for analysis. The most commonly used and accepted method for sodium cyanide sample preservation and testing are set forth in 40 CFR 136 (copy attached).

If detoxification of the entire heap has been achieved per the established criteria, then retained cyanide in that portion requiring off-liner recontouring should not be a major concern. Natural degradation will be greater in the surface portions of the heap along the pad perimeter. If retained cyanide is a concern the ore may be chemically treated during recontouring, or a layer of neutralizing agent, such as calcium hypochlorite (solid), may be placed beneath the off-liner area.

15. There is no monitoring plan (Jumbo letter 9/11/91). Jumbo's letter dated 9/11/91 states a commitment to monitor but no discussion of where monitoring sites are going to be located, what parameters are going to be tested, how often these parameters will be monitored, who will be conducting the laboratory analysis, who does the monitoring, to whom the results are reported, what threshold levels require remediation, and what remediation actions will be required when the threshold level is reached.

16. In Jumbo's letter dated 9/11/91, page 3, they state, "There should be no post-reclamation monitoring if the neutralization of the heap is performed correctly" is not valid. The purpose of post-reclamation monitoring is to verify that neutralization of the heap has been performed correctly; and to alert the regulatory agencies should a problem develop. There may be no need for post-reclamation treatment if neutralization has been performed correctly; but that does not mean the situation should not be carefully monitored. The Utah Cyanide Management plan will require at least 5 years after detoxification efforts are completed. The release of the reclamation bond will not take place until the post-reclamation monitoring period had been successfully completed.

17. The bentonitic clay material proposed to be used for leach pad liner is a common variety material and is not locatable under the Mining Law (Jumbo letter 9/11/91, page 4).

18. The borrow pit dimensions given in Jumbo's letter dated September 11, 1991, page 4, are 500 feet long, 150 feet wide, and 12 feet deep. Total acres disturbed for the pit and stockpiled topsoil was given as 1.452 acres. This acreage is incorrect. The pit itself is 1.72 acres and this does not include the topsoil stockpile.

19. Jumbo's letter dated 9/11/91, page 4, mentions existing contamination of the perched water table. This existing contamination must be defined in order to distinguish between pre-existing contamination and contamination caused by the current operation.

20. CBC Analysis dated 6/12/91, page 10 implies that soil material will not be removed from the leach pad site prior to construction. The soil removal should be required for reclamation purposes, and in some cases, soil removal may be necessary to maintain overall heap stability and/or liner integrity. Additional information is needed on this topic.

21. CBC Analysis, 6/12/91, page 14 does not define where the diversion ditches are, what design criteria were used, and what the peak flows would be. All runoff from precipitation or snowmelt should be diverted around the leach pad and process pond. Design criteria for diversion ditches should be adequate to accommodate runoff (prevent it from entering the heap) from at least a 25-year, 24-hour storm event.

22. The topographic map attached to the September 11, 1991, Jumbo letter appears to indicate that the diversion ditch goes in to the hill. If this is an correct interpretation of the topographic map, the diversion ditches are improperly designed.

23. CBC Analysis dated 6/12/91, page 14, projects a 0.6 million gallons runoff from the H-10 leach pad. This is confusing since there should be no runoff. All precipitation falling directly on the leach pad must be contained, and that falling beyond the leach pad should be diverted around the facility. Also, the calculations assume a 12-acre pad site but the Plan of Operations dated 3/26/91 discusses a 7.9 acre pad. Assuming the term runoff is used to mean the gain from the prescribed storm event, this back-calculates to 1.84 inches of precipitation over 12 acres. It is most likely that the 100-year, 24-hour event is considerably more than 1.84 inches. Of greater importance is the amount of solution which would accumulate during the net-precipitation period. Even in parts of the country where annual evaporation exceeds annual precipitation, there are still periods, typically during the spring months, where precipitation exceeds evaporation. It is for this build-up in combination with an extreme precipitation event, that facilities should be designed.

To properly anticipate solution storage requirements through the life of the project, a detailed water balance calculation is required. This consists of a spreadsheet that show on a monthly basis the static storage volume (could vary due to construction or reclamation, fresh ore wetting requirements, addition of make-up water, heap draindown volume, design storm surcharge requirements, and remaining freeboard). This water balance inventory would include all process components in the mine operation.

24. The Contingency Plan submitted by Jumbo, letter dated February 25, 1991, states that if a leak occurs, then that section of the heap will be closed and/or repaired. Depending on the location of a leak and the situation where it cannot be repaired, they state that the leaking section and all above sections which drain towards the leakage area would be permanently shut off. A possible design alternative would be the use of interior berms creating individual pad cells to enable isolating and monitoring if leakage is detected (refer to enclosed design drawing Idaho Gold-Buffalo Gulch).

25. The plan of operations dated 3/26/91, page 1 is missing the cross-sections and plan views of the loaded heap. These diagrams are needed in order to calculate reslope volumes for the reclamation bond.

26. The plan of operations dated 3/26/91, page 1, discusses ore crushing but does not specify a size. Will the ore be agglomerated after crushing? If so, this will affect detoxification efficiency and ultimately bond amount.

27. The plan of operations, 3/26/91, page 1, has not been designed with a protective layer of crushed ore over the liner. This protective layer of crushed ore is necessary to prevent damage to the liner during ore loading, especially if loaders are going to be driven onto the leach pad.

28. The plan of operation, 3/26/91, page 2, stated that only soils greater than 6 inches will be salvaged. This practice may bypass some good reclamation materials. The soil salvage criteria must be defined and agreed to by both the operator and the BLM prior to plan approval.

29. The plan of operation, 3/26/91, page 3, does not address final heap reclamation. If the heap is regraded, a map showing post-reclamation topography and drainages is recommended. If the heap is capped, then the capping criteria must be clearly defined in the reclamation plan. In addition, whichever reclamation method is used, the recontoured or capped heap should be revegetated.

30. We would not recommend waiting until the end of mine life before neutralizing any of the heaps. If all the heaps are rinsed at the end of mine life there will be a large volume of partially contaminated rinsate requiring expensive treatment and disposal. It would be preferable to rinse, or detoxify, old heaps concurrent with active mining operation. This may be done by cycling fresh make-up water through the old heaps prior to use on active leach pads. A new pond is probably not necessary, but if needed, it would not have to be built to process pond contaminant standards. Savings could be realized in increased metal recovery, lower reagents costs for make-up, minimal end of mine life solution requiring chemical treatment, minimal end of mine life solution disposal via land application or other means, and maintaining a lower reclamation bond.

31. The reclamation plan is not detailed enough to determine when successful reclamation has been achieved. Items that need to be address are as follows:

Sediment control system and interim revegetation.
Detailed information for their "Reclamation Activities and Treatment Map."
Drawings to scaled cross-sections of the original topography, topography at the completion of mining, and reclaimed topography.
Suitability of soils proposed for reclamation.
Identification of areas where soil materials will be salvaged, amounts of soil redistribution, depths and method, use of waste rock material as a growing media-if it is used, is it nontoxic?
Identification of areas requiring ripping prior to topsoil application.
Seed mixture and rate seedbed preparation.
Standards for successful revegetation, i.e., 70 percent of pre-mining vegetation.
Erosional control.
Reclamation schedule.
Estimated reclamation costs by type of disturbance.